

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: Charles Otis) Confirmation No: 1131
) Group Art Unit: 1725
Serial No.: 10/713,298)
) Examiner: Heinrich, Samuel M.
Filed: November 14, 2003)
) Atty. Docket No.: 200309850-1
For: Laser Micromachining and Methods)
of Same)

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This Appeal Brief under 37 C.F.R. § 41.37 is submitted in support of the Notice of Appeal filed August 13, 2007, responding to the final Office Action mailed June 12, 2007.

It is not believed that extensions of time or fees are required to consider this Appeal Brief. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. §1.136(a), and any fees required therefor are hereby authorized to be charged to Deposit Account No. 08-2025.

I. Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC, headquartered in Palo Alto, CA.

II. Related Appeals and Interferences

There are no known related appeals or interferences that will affect or be affected by a decision in this Appeal.

III. Status of Claims

Claims 9-16 stand finally rejected. No claims have been allowed. Claims 1-8 and 17-39 have been canceled. The rejections of claims 9-16 are appealed.

IV. Status of Amendments

This application was originally filed on November 14, 2003, with thirty-nine (39) claims. In a Response filed December 19, 2005, Applicant presented remarks without any claim amendments. In a Response filed May 5, 2006, Applicant amended claims 1, 5, 7, 8, 17, 20, and 21 and canceled claims 4, 19, and 22 but the amendments were not entered by the Examiner. In a Response filed June 7, 2006, Applicant amended claims 1, 5, 7, 8, 17,

20, and 21 and canceled claims 4, 19, and 22 and the amendments were entered by the Examiner. In a Response filed September 15, 2006, Applicant canceled claims 1-8 and 17-39 in response to a restriction requirement issued by the Examiner. In a Response filed February 22, 2007, Applicant amended claim 11. The claims in the attached Claims Appendix (see below) reflect the present state of Applicant's claims.

V. Summary of Claimed Subject Matter

The claimed inventions are summarized below with reference numerals and references to the written description ("specification") and drawings. The subject matter described in the following appears in the original disclosure at least where indicated, and may further appear in other places within the original disclosure.

Embodiments according to independent claim 9 describe an apparatus comprising at least one laser source (Fig. 4, 408) that supplies a laser beam to operate on a substrate (Fig. 4, 300a) at a laser interaction zone (Fig. 4, 412) to form a feature in the substrate (Fig. 4, 300a) and a first nozzle (Fig. 5, 502a) oriented to deliver liquid (Fig. 5, 422a) along a first liquid supply path to the feature, so that the liquid (Fig. 5, 422a) is delivered to the laser interaction zone (Fig. 4, 412). Applicant's specification, paragraph 00032 of page 10 and paragraph 00040 of pages 12-13. The apparatus further comprises at least a second different nozzle (Fig. 5, 502b) oriented to deliver liquid (Fig. 5, 422b) to the laser interaction zone (Fig. 4, 412) along a second different liquid supply path. Applicant's specification, paragraph 00040 of pages 12-13. The first nozzle (Fig. 5, 502a) and at least the second different nozzle (Fig. 5,

502b) are selectively activated based upon the location of the laser interaction zone (Fig. 4, 412) in the substrate (Fig. 4, 300a). Applicant's specification, paragraph 00056 of page 18.

Claim 11 is a dependent claim of claim 9. In addition to the features of claim 9, claim 11 further describes an apparatus comprising a controller (Fig. 4, 430) for selectively controlling a delivery of liquid (Fig. 5, 422a, 422b) from individual nozzles (Fig. 5, 502a, 502b) wherein the controller (Fig. 4, 430) is configured to shut-off the flow of liquid (Fig. 5, 422a) from the first nozzle (Fig. 5, 502a) to allow the at least a second nozzle (Fig. 5, 502b) to deliver liquid (Fig. 5, 422b) to the laser interaction zone (Fig. 4, 412) by reducing potential interference caused by intersection of streams of liquid (Fig. 5, 422a, 422b) from the first nozzle (Fig. 5, 502a) and the at least a second nozzle (Fig. 5, 502b). Applicant's specification, paragraphs 00052-00053 of pages 16-17.

VI. Grounds of Rejection to be Reviewed on Appeal

The following grounds of rejections are to be reviewed on appeal:

Claims 9, 10, and 12-16 have been rejected under 35 U.S.C. § 102(b) as being anticipated by DE 4138468.

Claims 14-16 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over DE 4138468 in view of WO 03028943 A1.

Claims 9-16 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over DE 4138468 in view of *Terada* (U.S. Patent Application Publication No. 2004/0197433 A1).

VII. Arguments

The Appellant respectfully submits that Applicant's claims 9-16 are patentable. The Appellant respectfully requests that the Board of Patent Appeals overturn the rejection of those claims at least for the reasons discussed below.

A. Claims Rejected Under 35 U.S.C. § 102(b)

Claims 9, 10, and 12-16 have been rejected under 35 U.S.C. § 102(b) as being anticipated by DE 4138468.

It is axiomatic that "[a]nticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983). Therefore, every claimed feature of the claimed subject matter must be represented in the applied reference to constitute a proper rejection under 35 U.S.C. § 102(b). In the present case, not every feature of the claimed subject matter is represented in the DE 4138468 reference. Applicant discusses the DE 4138468 reference and Applicant's claims in the following.

1. The DE 4138468 Reference

DE 4138468 describes that a spray unit 10 directs liquid and gas into the path of a laser beam 18, as shown in the figure accompanying the abstract. Further, the abstract states that there is "constant spraying of the work area."

2. Applicant's Claim 9

As provided in independent claim 9, Applicant claims:

An apparatus comprising:

at least one laser source that supplies a laser beam to operate on a substrate at a laser interaction zone to form a feature in the substrate;

a first nozzle oriented to deliver liquid along a first liquid supply path to the feature, so that the liquid is delivered to the laser interaction zone; and,

at least a second different nozzle oriented to deliver liquid to the laser interaction zone along a second different liquid supply path, ***wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate.***

(Emphasis added).

Applicant respectfully submits that independent claim 9 is allowable for at least the reason that DE 4138468 does not disclose, teach, or suggest at least "wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate," as recited and emphasized above in claim 9.

Rather, DE 4138468 teaches that a spray unit 10 directs liquid and gas into the path of a laser beam 18, as shown in the figure accompanying the abstract. Further, the abstract states that there is "constant spraying of the work area." Thus, DE 4138468 does not teach or suggest "wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate," as recited in claim 9. Thus, claim 9 is not anticipated by DE 4138468, and the rejection should be withdrawn.

In the final Office Action of June 12, 2007, the Examiner argues that the claim language "the first and second nozzles are selectively activated" is a recitation of intended use of the claimed invention and should not be

considered in determining whether the claim is patentably distinguished from the prior art. Page 4. In response, Applicant respectfully submits that the claim recites functional limitations for the claimed apparatus, such as "wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate," which are not taught or suggested by the cited art. MPEP section 2173.05(g) clearly states that a "functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used." Accordingly, all of the limitations of claim 9 have not been shown by the Examiner to be disclosed by the cited art. For at least this reason, the rejection of claim 9 should be overturned.

3. Applicant's Claims 10 and 12-16

Because independent claim 9 is allowable over the cited art of record, dependent claims 10 and 12-16 (which depend from independent claim 9) are allowable as a matter of law for at least the reason that the dependent claims 10 and 12-16 contain all the features of independent claim 9. For at least this reason, the rejections of claims 10 and 12-16 should be overturned.

Additionally and notwithstanding the foregoing allowability of claims 10 and 12-16, these claims recite further features and/or combinations of features (as is apparent by examination of the claim itself) that are patentably distinct from the cited art of record. Hence, there are other reasons why these dependent claims are allowable.

B. Claims Rejected Under 35 U.S.C. § 103(a)

1. Rejection of Claims 14-16 by DE 4138468 in view of WO 03028943 A1

Claims 14-16 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over DE 4138468 in view of WO 03028943 A1. Applicant respectfully traverses the rejection of claims 14-16 based on the proposed combination of DE 4138468 in view of WO 03028943 A1.

For at least the reasons given above, claim 9 is allowable over the cited art of record. Since claims 14-16 depend from claim 9 and recite additional features, claims 14-16 are allowable as a matter of law over the cited art. Further, WO 03028943 A1 discloses the use of only one spray nozzle and not a first and a second different nozzle as described in the claim. Therefore, WO 03028943 A1 does not help to cure the deficiencies of the DE 4138468 reference.

2. Rejection of Claims 9-16 by DE 4138468 in view of *Terada*

Claims 9-16 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over DE 4138468 in view of *Terada* (U.S. Patent Application Publication No. 2004/0197433 A1). Applicants respectfully traverse the rejection of claims 9-16 based on the proposed combination of DE 4138468 in view of *Terada*.

Applicants respectfully submit that independent claim 9 is allowable for at least the reason that DE 4138468 does not disclose, teach, or suggest at

least "wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate," as recited and emphasized above in claim 9.

For example, DE 4138468 teaches that a spray unit 10 directs liquid and gas into the path of a laser beam 18, as shown in the figure accompanying the abstract. Further, the abstract states that there is "constant spraying of the work area." Thus, DE 4138468 does not teach or suggest "wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate," as recited in claim 9.

Further, *Terada* describes that water is emitted from second nozzles at a flow velocity that is slower than water emitted from a first nozzle. The difference in pressure between the flow velocities causes resist removed from a wafer to be removed within the flow of water from the first nozzle sandwiched between the flows of water from the second nozzles. See para. 0170. As such, in *Terada*, the first and second nozzles are directed towards the same location and are not shown to be selectively activated based upon the location of the laser interaction zone in the substrate. In particular, *Terada* discloses a fixed laser interaction zone (e.g., area near the alignment mark on the substrate) that is not variable, so activation of a first or second nozzle is not based on the location of the interaction zone in *Terada*. Therefore, *Terada* fails to teach or suggest "wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate," as recited in claim 9.

Accordingly, a *prima facie* case establishing an obviousness rejection by DE 4138468 in view of *Terada* has not been made. Thus, claim 9 is not obvious under proposed combination and the rejection should be overturned. Since claims 10-16 depend from claim 9 and recite additional features, claims 10-16 are allowable as a matter of law over the cited art.

As an example, claim 11 recites "wherein the controller is configured to shut-off the flow of liquid from the first nozzle to allow the at least a second nozzle to deliver liquid to the laser interaction zone by reducing potential interference caused by intersection of streams of liquid from the first nozzle and the at least a second nozzle" and *Terada* diversely discloses that flows from first and second nozzles are emitted at the same time and in the same location to create a pressure difference. For at least this reason, DE 4138468 in view of *Terada* fails to disclose that a flow of liquid from a first nozzle is shut-off to allow delivery of liquid from a second nozzle by reducing potential interference from streams from different nozzles, as described in claim 11. In direct contrast, *Terada* intentionally causes interference from different streams.

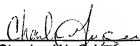
Overturning of the rejections is respectfully requested.

VIII. Conclusion

In summary, it is Applicant's position that Applicant's claims are patentable over the applied cited art references and that the rejection of these claims should be withdrawn. Appellant therefore respectfully requests that the Board of Appeals overturn the Examiner's rejection and allow Applicant's pending claims.

Respectfully submitted,

By:



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Claims Appendix under 37 C.F.R. § 41.37(c)(1)(viii)

The following are the claims that are involved in this Appeal.

1-8. Canceled

9. An apparatus comprising:

at least one laser source that supplies a laser beam to operate on a substrate at a laser interaction zone to form a feature in the substrate;

a first nozzle oriented to deliver liquid along a first liquid supply path to the feature, so that the liquid is delivered to the laser interaction zone; and,

at least a second different nozzle oriented to deliver liquid to the laser interaction zone along a second different liquid supply path, wherein the first nozzle and at least the second different nozzle are selectively activated based upon the location of the laser interaction zone in the substrate.

10. The apparatus of claim 9, wherein the first nozzle and the at least a second nozzle comprise a plurality of nozzles oriented to provide liquid in a pattern generally approximating a footprint of the feature.

11. The apparatus of claim 9 further comprising a controller for selectively controlling a delivery of liquid from individual nozzles wherein the controller is configured to shut-off the flow of liquid from the first nozzle to allow the at least a second nozzle to deliver liquid to the laser interaction zone by reducing potential interference caused by intersection of streams of liquid from the first nozzle and the at least a second nozzle.

12. The laser machining apparatus of claim 9, wherein the feature is an elongate feature which extends generally along a long axis between a first feature end and a generally opposing second feature end, and wherein the first nozzle is positioned proximate to the first feature end and the second nozzle is positioned proximate to the second feature end.

13. The apparatus of claim 9, wherein the first nozzle and the at least a second nozzle are configured to deliver liquid in the form of an atomized mist.

14. The laser machining apparatus of claim 9, wherein the first liquid supply path lies at a 50 degree angle relative to a first substrate surface into which the feature is formed and the second axis lies at a 50 degree angle to the first surface and 80 degrees relative to the second liquid supply path.

15. The laser machining apparatus of claim 14, wherein the first nozzle and the second nozzle each terminate about 10 microns above the first substrate surface into which the feature is formed.

16. The laser machining apparatus of claim 14, wherein the first nozzle is positioned at least about 5 millimeters back from the first feature end and the second nozzle is positioned at least about 5 millimeters from a second feature end.

17-39. Canceled

Evidence Appendix under 37 C.F.R. § 41.37(c)(1)(ix)

There is no extrinsic evidence to be considered in this Appeal.

Therefore, no evidence is presented in this Appendix.

Related Proceedings Appendix under 37 C.F.R. § 41.37(c)(1)(x)

There are no related proceedings to be considered in this Appeal.

Therefore, no such proceedings are identified in this Appendix.